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JUN 30 2008
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June 23, 2008

Mark Walker, Director
Public Affairs
Northwest Power and Conservation Council
Suite 1100
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Sent by Email

JUN 30 2008

RE: Comments on biological indicators

Dear Mr. Walker,

Thank you for the opportunity to comment on the biological indicators proposal for the Council's Fish and Wildlife program. I have reviewed the power point presentation and have a few comments to offer, however, before the Council moves too far on this important task I recommend an independent scientific review. Biological indicators and their adoption have always been controversial and I am pleased they are coming up again. Because they are controversial, I believe it is important to have strong scientific support for them – hence the scientific review. However, I am also aware that it is important to get these indicators incorporated into the program so a thorough yet speedy response would be best from the science team.

At the end of these comments I have included an approach to developing biological indicators that may be useful in developing a Council plan.

Total Abundance

It would be most instructive if the measurement of total abundance were for wild salmonids and for hatchery salmonids, so that the abundance of both forms can be tracked on an annual basis. This should include all species and races or subpopulations such as winter steelhead and summer steelhead. Since the Council has been making a major investment into subbasins it would be vital for the program to have an annual accounting of abundance not only in the mainstem Columbia River, but in each of the subbasins. This could be useful in helping to evaluate the Council's program and in making any adjustments.

ESU Abundance

It is important to have information on the abundance of salmonids and their productivity in each ESU. The Council also recognizes that Columbia River Basin ESUs are large and diverse. For example, the Mid-Columbia ESU includes streams with winter steelhead above one mainstem dam and summer steelhead above 4 mainstem dams. The streams in this ESU are biologically diverse and so are their salmonid populations. Given this diversity, I strongly suggest that trends in abundance of wild salmonids and their productivity in each watershed with ESA-listed salmonids become the standard metric for tracking success, but also for evaluating the effects of project investments.

Since watersheds that are not now housed in an ESU nomenclature could become so at any time, it would be very helpful to include abundance information on them too.

Adult trend data measures survival in the migration and ocean phase of the salmonid life cycle; the juvenile trend data measures the productivity of the habitat in subbasins. Both measures are needed to fully inform the Council's program because both kinds of abundance and productivity measurement help evaluate distinct program elements.

Atlantic salmon rebuilding efforts in eastern Canada have developed "conservation requirements" for each population of salmon in each river catchment. It is based on an estimate of the watershed's salmon carrying capacity, the egg deposition required to seed that habitat, and the number of adults it will take to achieve it. This policy addresses both aspects of the Council's biological indicator on abundance and productivity. In-season monitoring of the salmon run can give some indication whether the conservation requirement will be achieved, and if it may fall short, then the fisheries are closed to improve spawner abundance. This was recently done for the Skagit wild winter steelhead and Deshka River (Alaska) chinook salmon.

Salmonid abundance and productivity should be based on a principle like the conservation requirement used by Canada and Alaska where their fisheries are managed to achieve abundance objectives. It is call escapement management. I could be wrong about this, but I do not believe there are many streams managed to achieve abundance targets for wild salmonids in the Columbia basin. Doing so would probably mean a long and involved discussion with the management agencies, but the value to salmonid recovery would be its justification.

Recognizing that one of the important deliverables of harvest management is spawner abundance, it would be appropriate to have spawner abundance targets by species and population per watershed in the Council's program. The action agencies can decide whether they want to manage to achieve them, but having them would help the Council establish a rational recovery program for salmon with a logical and scientific basis.

Life-cycle mortality

Having life cycle mortality estimates for wild, native salmonids should include spring chinook, coho, sockeye, and steelhead since these fish are more dependent upon their natal streams than other species such as chum salmon and fall chinook. Reference streams in each ESU that capture the ecological diversity represented should be established for this biological indicator. A mortality profile on natural salmon populations is informative and will provide information important to recovery management for these fish and the ESUs they occupy. Having information on ocean and freshwater mortality will improve the information needed by managers, especially as it is collected over the long-term.

Warm water in the Columbia during the summer is an increasing problem. In Bonneville Pool, there are a number of important thermal refuges used by migrating salmonids (adults) especially summer steelhead and fall chinook. These thermal refuges should be identified and managed for their benefit to migrating fish. Fall chinook have a more restricted migration time and even though the river is warm, they are forced to continue migration in order to make their spawning grounds on time. The effect of warm water on fall chinook mortality and reproductive success should be a factor in assessing overall mortality for this fish.

Recognizing the value of thermal refuges in the mainstem Columbia River means that the benefit they provide migrating salmonids during hot water flows are maintained. This requires that the source of the thermal refuges is protected, so that streams such as Herman Creek and Little White Salmon River are not damaged by land development or water withdrawals, both of which compromise their cold water integrity. Many of these thermal refuges are also open to harvest fisheries, so the fish that hold in them for relief from hot mainstem flows are not fully protected. Since the fish that use these refuges are from throughout the entire Columbia Basin above Bonneville Pool, harvest impacts on these concentrations of fish affect recovery efforts in all ESUs.

<u>Harvest</u>

Is harvest supporting recovery of ESA-listed salmonids or is it impeding recovery? That is an important question to answer. As long as the managers do not have abundance targets for wild salmonid spawners that serve as a constraint on harvest, it is likely that harvest is impeding recovery. In Oregon, Washington, and Idaho, harvest is not structured to achieve spawner abundance goals as in Alaska or for Atlantic salmon in Canada. Harvest is based on abundance which is tied to hatchery production. While there is more consideration now for wild salmon than in the 1980s when 90% harvest rates were common and wild salmon were not a constraint, harvest is still not structured to achieve escapement objectives. Spawner abundance objectives for each ESA-listed species by watershed are needed. These objectives would fully seed the habitat and maintain the biological diversity of the populations affected by harvest.

Information on harvest rate and number do not provide information on whether spawner abundance objectives were achieved or if harvest is impeding recovery of ESA-listed stocks. An annual spawner abundance accounting tied to harvest management is needed to establish sound recovery program.

Knowing the number of hatchery fish in the Council's program contributing to harvest is important. It moves the hatchery program further along in terms of evaluation. Not only is it important to know the extent of contribution, it is important to know the cost to catch of fish that did contribute to the fishery. In phase one of the IEAB hatchery cost evaluation the Council began to gain insight into the cost of hatchery salmon that are harvested. I recommend that phase two of the IEAB hatchery cost evaluation be initiated to determine the cost of delivering a product to fisheries from all hatchery programs.

Relative fitness of hatchery fish is an important issue to fully explore. Hatchery supplementation is regarded as an experiment that has not been fully tested, but the Council has invested in evaluation. We know from spring chinook studies on the Yakima and steelhead studies on the Hood River that hatchery fish fitness is lower than wild fish and it gets worse with each hatchery generation. The purpose of hatchery supplementation is to provide a recovery tool for ESA-listed salmonids, but so far scientific evaluation indicates that it is a drag on recovery of wild populations and could be doing real damage.

I recommend that testing hatchery supplementation is still an important investment, but further investment in hatchery supplementation programs is inappropriate given the negative results of studies so far.

The Council should invest in natural recovery evaluation in the Basin. The Asotin Creek natural recovery program evaluation is probably the only test of natural recovery in the entire basin. The Council should secure the funding for the Asotin project (due to be deleted by BPA) and select other watersheds to evaluate natural recovery. These watersheds could be important reference streams under the Council's fish and wildlife program. Some candidate streams that come to mind are Molalla River winter steelhead (Willamette ESU); Sandy R (Lower Columbia River ESU) winter steelhead, spring chinook, coho and fall chinook; Wind River (LCR ESU) summer steelhead,; EF Lewis River (LCR ESU) summer and winter steelhead, fall chinook, coho; John Day River (Mid Columbia ESU) spring chinook and summer steelhead, and Deschutes River (Mid Columbia ESU) summer steelhead in tributaries such as Buckhollow, Bakeoven, Trout, Shitike creeks and Warm Spring River.

<u>Hydrosystem Survival</u>

Not only should survival rates be evaluated and survival objectives determined, it is important to also address the straying of transported fish when they return to spawn. Stray hatchery fish defeat the purpose of a hatchery program for the fish do not return to where they were intended, but more importantly, the strays create problems when they compete and interbreed with wild fish. Stray rate criteria should be adopted and efforts made to reduce stray rates from transported fish to less than 5%. This level of non-native strays was recommended at a NMFS workshop in May 1997. In addition, the TRT steelhead status report on Mid-Columbia tributaries in Oregon identified "out-of-ESU hatchery strays from Snake River hatchery programs as a primary risk" and leading to a "non-viable" status determination for ESA-listed steelhead in the John Day and Deschutes rivers.

Even though a mark is required on hatchery fish, usually a clipped adipose fin and a coded wire tag, up to 3 million hatchery steelhead are being released in the upper

Columbia River with no mark or tag. These fish are difficult to detect, sort, and inventory if they stray. Unmarked stray hatchery steelhead in rivers with ESA-listed steelhead present a problem and impede recovery. Since it is required that all hatchery fish be marked, the Council should enforce that at hatcheries it funds and encourage it in all hatcheries. Unmarked stray hatchery fish are a biological problem.

Habitat

Evaluating the productivity of wild fish in freshwater habitats is important and more of this work should be completed to verify the Council's program goals. Productivity of egg to smolt is one important measure for it relates to the variety of habitats needed in freshwater to support the life history needs of the fish. Productivity of smolt to adult helps measure survival through mainstem migration and ocean productivity. Both of these measurements should be made so that both the freshwater and saltwater parts of salmonid life history can be evaluated. This is important to determine areas of poor survival. For example, research on the Keogh River determined that the freshwater habitat and nutrient loading produce abundant and healthy smolts, but smolt to adult survival is low indicating a marine survival problem.

Research is accumulating that strongly supports nutrient enrichment of streams with salmon carcasses. Juvenile production and survival is improved with more salmon carcasses in the river. Our streams are starved for nutrients and present day salmon spawner abundance is far below what it was 150 years ago. The Council should develop, based on scientific advice, a nutrient loading target for streams. In the peer reviewed literature nutrient loading range from 0.15, 0.7, and 1.9 kg/meter squared.

Passage Barriers

Removing barriers to adult and juvenile fish passage ensures that the full watershed is available for spawning and rearing. Barrier removal also supports seasonal use of streams that provide a thermal refuge for fish, increasing survival and productivity of the stream. Making tributaries available to spawning and rearing should be a major concern for the Council as it tries to provide the conditions supportive of salmonid recovery and abundance. That said, it is important to maintain partial or complete natural barriers to salmonid migration. Barriers that form a hydrological separation between winter and summer steelhead stocks maintains the genetic separation between these two stocks, while removing the barrier ensures hybridization and loss of life history diversity. Streams above impassable barriers are not fishless, but contain distinct populations of resident fish that have not co-evolved with anadromous fish found below the barrier. By breaching impassable barriers, there is a risk of losing biological diversity in watersheds. Consequently, the Council should adopt a policy that maintains partial and complete natural barriers to anadromous fish while removing artificial (human made) barriers.

Sincerely,

Bill M. Bakke, Director
Native Fish Society

Attachment

SALMONID CONSERVATION AND RECOVERY MANAGEMENT STRATEGY

1. **DEFINE CONSERVATION MANAGEMENT UNITS**
    - **LOCALLY ADAPTED POPULATION PER WATERSHED**
2. **INVENTORY BIOLOGICAL DIVERSITY**
    - **GENETIC STRUCTURE**
    - **LIFE HISTORY ATTRIBUTES**
3. **ADOPT BIOLOGICAL OBJECTIVES**
    - **OVER ENTIRE LIFE CYCLE**
    - **MEASURABLE BIOLOGICAL OBJECTIVES**
    - **MAINTAIN BIOLOGICAL DIVERSITY OBJECTIVES**
4. **DEVELOP MANAGEMENT PLANS TO MAINATIN BIOLOGICAL DIVERSITY**
5. **CONDUCT INDEPENDENT SCIENTIFIC AUDIT**
    - **WERE BIOLOGICAL OBJECTIVES ACHIEVED?**
    - **IDENTIFY CRITICAL UNCERTAINTIES**
    - **IDENTIFY RESEARCH TO ADDRESS UNCERTAINTIES**
6. **POLICY AUDIT**
    - **DID WE DO WHAT WE SAID WE WOULD DO?**
    - **IDENTIFY POLICY AND MANAGEMENT PROBLEMS AND CHANGES**
    - **CARRY OUT ADAPTIVE MANAGEMENT CHANGES**
    - **COMPLIANCE MONITORING**